US009049896B2

(12) **United States Patent**
Huh

(10) **Patent No.: US 9,049,896 B2**
(45) **Date of Patent: Jun. 9, 2015**

(54) **DETACHABLE SAFETY GOGGLES FOR SAFETY HELMETS**

(71) Applicant: **OTOS TECH CO., LTD.**, Seoul (KR)

(72) Inventor: **Moon Young Huh**, Seoul (KR)

(73) Assignee: **OTOS TECH CO., LTD.** (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 273 days.

(21) Appl. No.: **13/905,217**

(22) Filed: **May 30, 2013**

(65) **Prior Publication Data**

US 2013/0318673 A1 Dec. 5, 2013

(30) **Foreign Application Priority Data**

May 31, 2012 (KR) 10-2012-0058512

(51) **Int. Cl.**
A42B 3/04 (2006.01)
A42B 3/18 (2006.01)

(52) **U.S. Cl.**
CPC ***A42B 3/0406*** (2013.01); ***A42B 3/185*** (2013.01)

(58) **Field of Classification Search**
CPC A42B 1/06; A42B 1/247; A42B 3/0406; A42B 3/185; G02C 3/02; G02C 5/14; G02C 5/20; G02C 5/22; G02C 5/30
USPC 2/210, 13, 209.13, 417, 418, 422, 426; 351/155
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

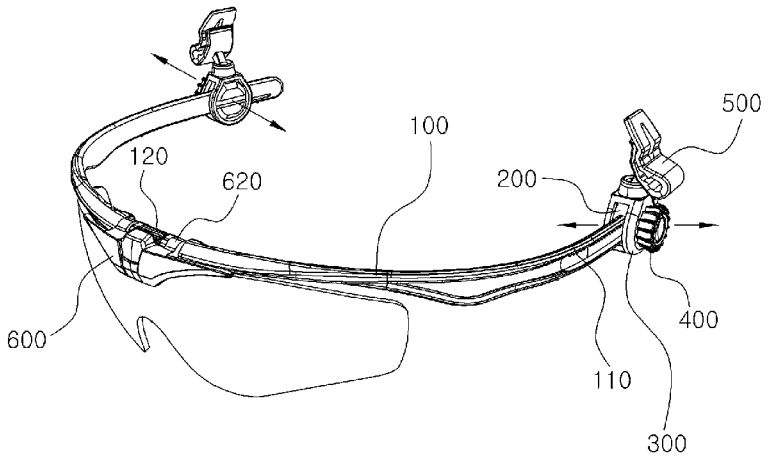
2,511,234 A * 6/1950 Anderson 2/8.1
3,214,809 A * 11/1965 Edwards ..... 24/68 B
3,325,824 A * 6/1967 Donegan 2/8.1
3,444,560 A * 5/1969 Northup, Jr 2/8.1
3,907,410 A * 9/1975 Richmond et al. 351/119
4,017,165 A * 4/1977 Davis 351/153
4,153,348 A * 5/1979 Walters et al. 351/118
4,792,221 A * 12/1988 Parks et al. 351/120
4,856,109 A * 8/1989 Desy et al. 2/9
4,999,846 A * 3/1991 Ball et al. 2/5
5,129,102 A * 7/1992 Solo 2/10
5,261,124 A * 11/1993 Day 2/10
5,289,592 A * 3/1994 Paivarinta 2/431
5,357,654 A * 10/1994 Hsing-Chi ..... 24/68 B
5,471,259 A * 11/1995 Cahill 351/155
5,533,208 A * 7/1996 Tonoyan et al. 2/10
5,689,827 A * 11/1997 Ryder 2/10
5,692,234 A * 12/1997 Yuen 2/10
5,778,448 A * 7/1998 Maher 2/10
5,987,640 A * 11/1999 Ryder 2/10
6,237,147 B1 * 5/2001 Brockman 2/10
6,293,673 B1 * 9/2001 Hirschman et al. 351/123
(Continued)

Primary Examiner — Clinton T Ostrup
Assistant Examiner — Anne Kozak
(74) *Attorney, Agent, or Firm* — Cantor Colburn LLP

(57) **ABSTRACT**

Disclosed are detachable safety goggles for safety helmets including a frame provided with rack gears formed at both leg parts thereof, inner housings allowing the leg parts to enter and exit the inner housings and provided with first snap protrusions, outer housings allowing the leg parts to enter and exit the outer housings and provided with first snap gears, rotating handles combined with the outer housings and provided with pinion gears corresponding to the rack gears, and holders combined with the upper ends of the outer housings and combined with the frame of a safety helmet. The detachable safety goggles for safety is detachably attached to the safety helmet, and the wearing distance and angle of the goggles with a worker may be conveniently adjusted as the worker desires.

6 Claims, 8 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

6,314,588	B1 *	11/2001	Fang	2/418
6,397,396	B1 *	6/2002	Vibert	2/209.13
6,454,406	B1 *	9/2002	Guo	351/120
6,490,729	B1 *	12/2002	Dondero	2/10
6,491,390	B1 *	12/2002	Provost	351/155
6,708,376	B1 *	3/2004	Landry	24/68 R
6,807,679	B1 *	10/2004	Wang-Lee	2/10
6,837,579	B1 *	1/2005	Chen	351/120
6,892,393	B1 *	5/2005	Provost et al.	2/10
6,935,741	B2 *	8/2005	Denney	351/155
7,000,262	B2 *	2/2006	Bielefeld	2/418
7,147,323	B1 *	12/2006	Wu	351/155
7,172,284	B1 *	2/2007	Sasaki	351/155
7,174,575	B1 *	2/2007	Scherer	2/418
7,207,673	B1 *	4/2007	Ho	351/155
7,448,092	B2 *	11/2008	Wu	2/171
7,866,813	B2 *	1/2011	Anhalt	351/155
7,896,491	B1 *	3/2011	Lin	351/120
7,926,938	B2 *	4/2011	Lu	351/155
8,015,625	B2 *	9/2011	Grim et al.	2/420
8,032,993	B2 *	10/2011	Musal	24/68 B
8,161,576	B2 *	4/2012	Lemke et al.	2/418
8,214,921	B2 *	7/2012	Grad et al.	2/9
8,434,168	B2 *	5/2013	Paulson	2/427
8,578,521	B2 *	11/2013	Rogers et al.	2/417
8,677,517	B1 *	3/2014	Morency et al.	2/424
2002/0085171	A1 *	7/2002	Wang-Lee	351/120
2005/0078273	A1 *	4/2005	Holm	351/155
2005/0160511	A1 *	7/2005	Kim	2/10
2006/0055875	A1 *	3/2006	Yang	351/120
2006/0080761	A1 *	4/2006	Huh	2/424
2006/0221297	A1 *	10/2006	Tsai	351/41
2009/0235437	A1 *	9/2009	Springer et al.	2/422
2009/0313745	A1 *	12/2009	Kang et al.	2/424
2010/0095438	A1 *	4/2010	Moelker	2/418
2010/0154093	A1 *	6/2010	Provost et al.	2/10
2011/0088148	A1 *	4/2011	Chen	2/418
2011/0154551	A1 *	6/2011	Spink	2/10
2012/0204330	A1 *	8/2012	Albouy	2/421
2012/0281429	A1 *	11/2012	Orozco et al.	362/572
2012/0291173	A1 *	11/2012	Gleason et al.	2/10
2014/0013480	A1 *	1/2014	Treger et al.	2/10
2015/0059064	A1 *	3/2015	Klotz et al.	2/417
2015/0085243	A1 *	3/2015	Wu	351/114

* cited by examiner

FIG. 1

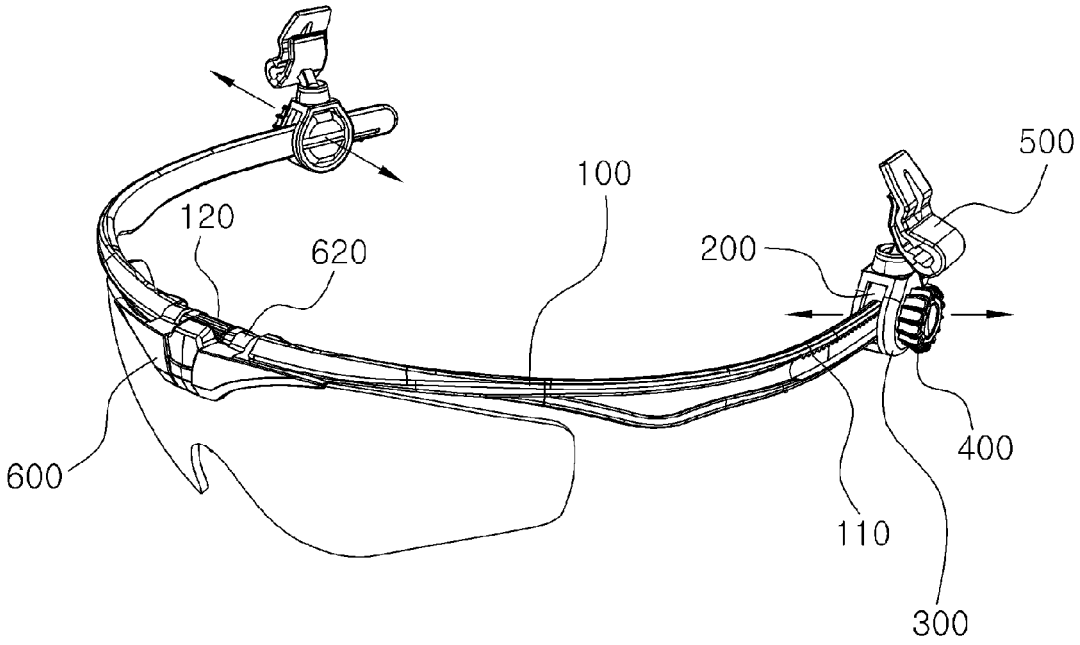


FIG. 2

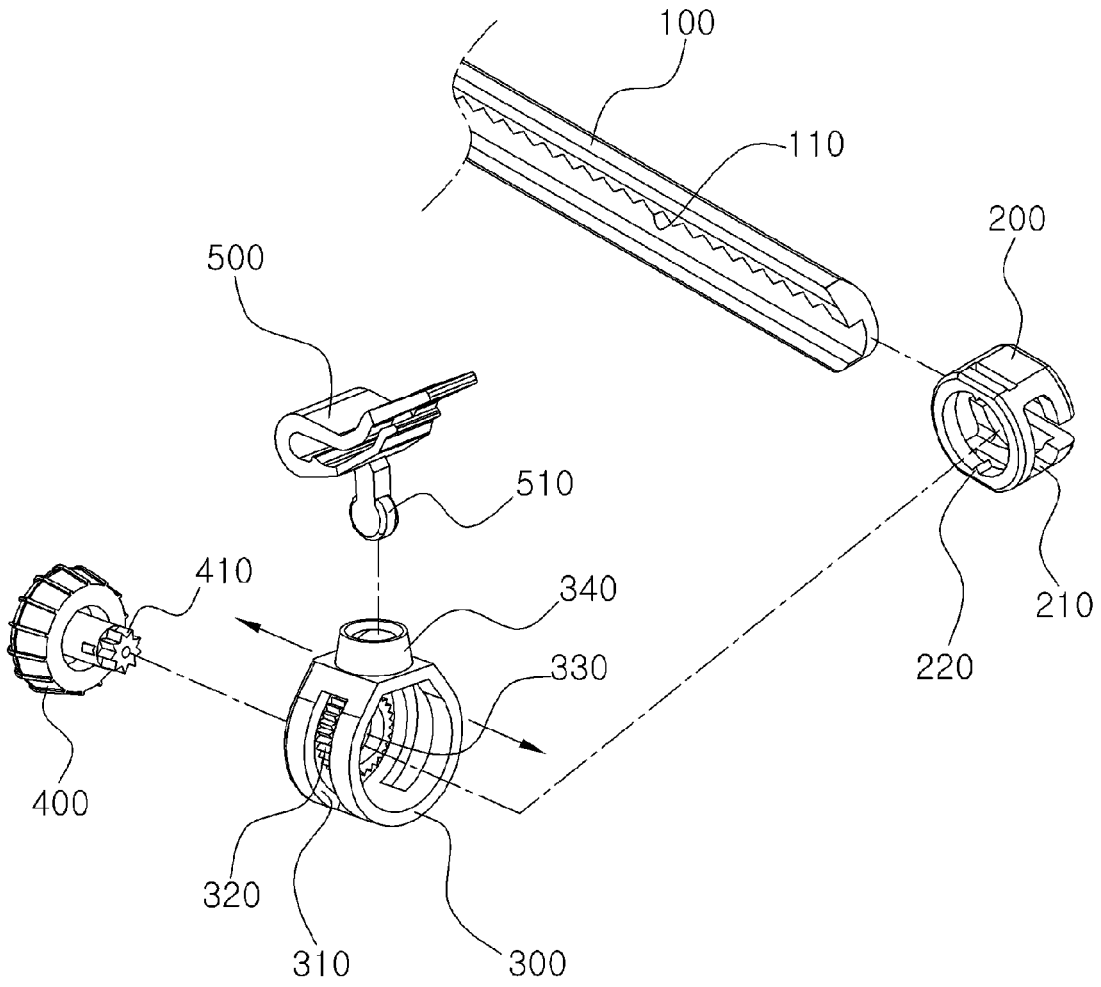


FIG. 3

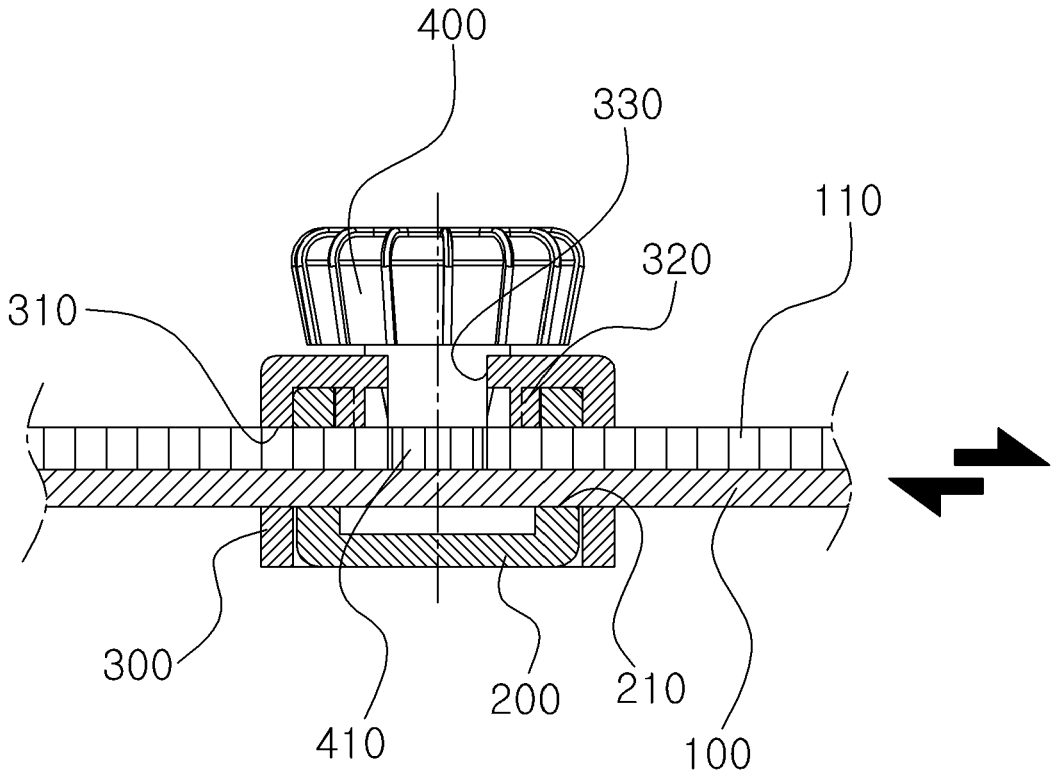


FIG. 4

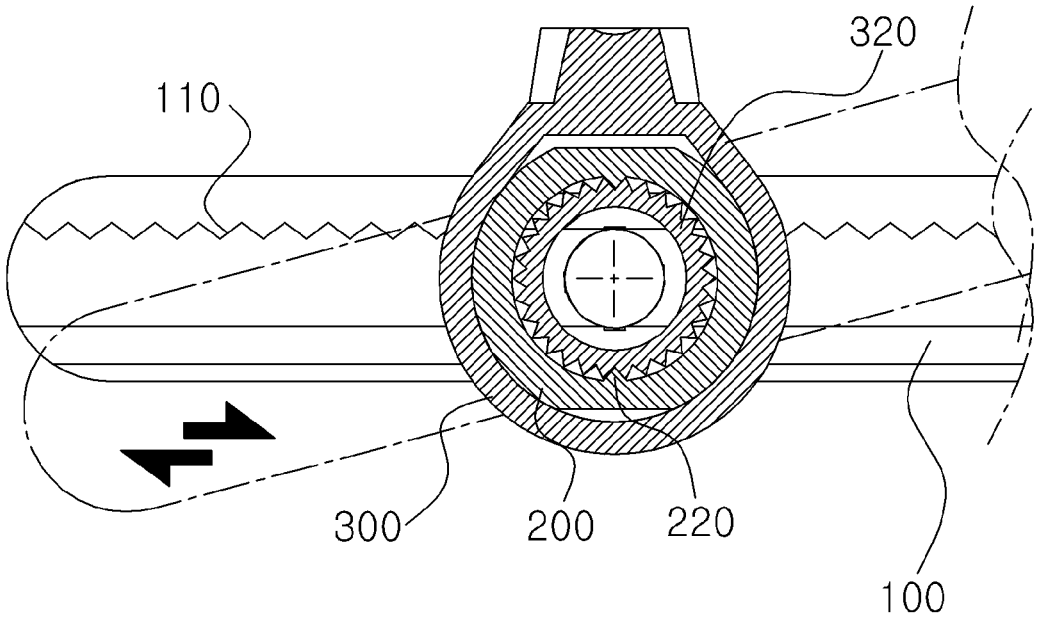


FIG. 5

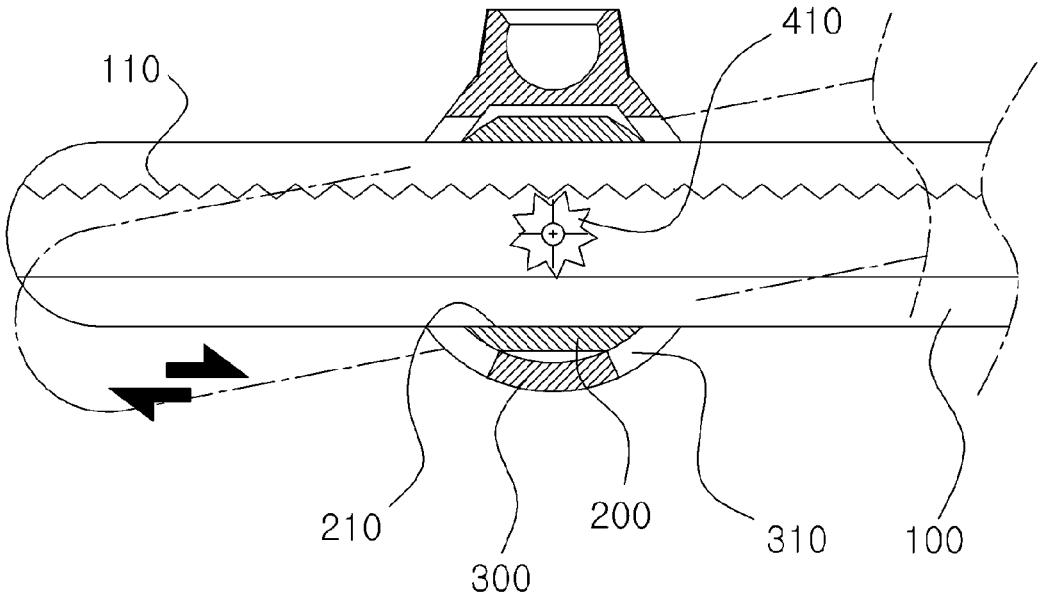


FIG. 6

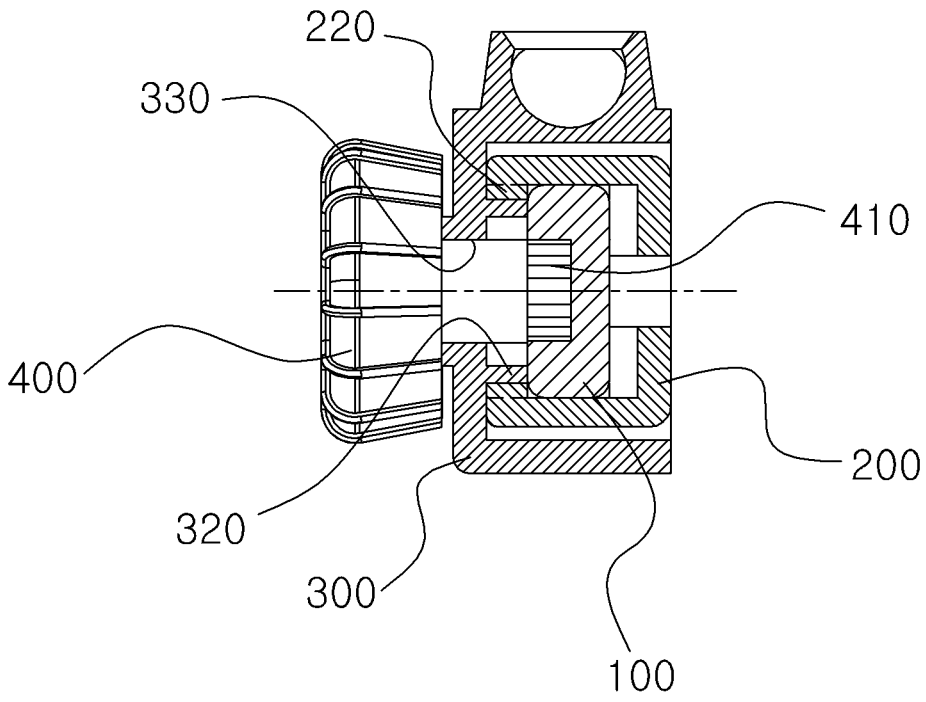


FIG. 7

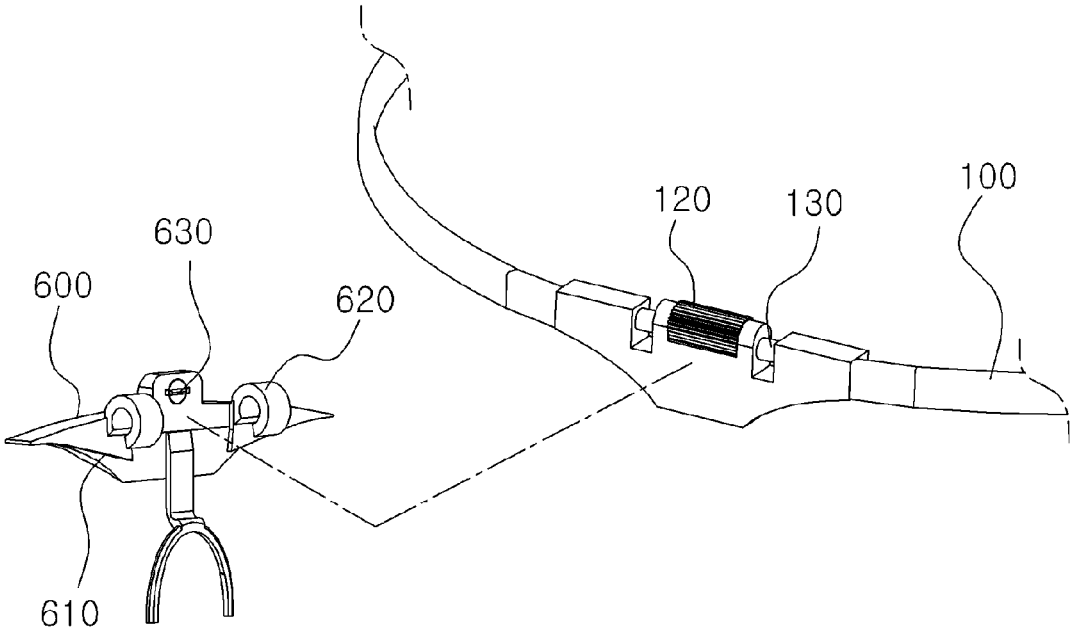
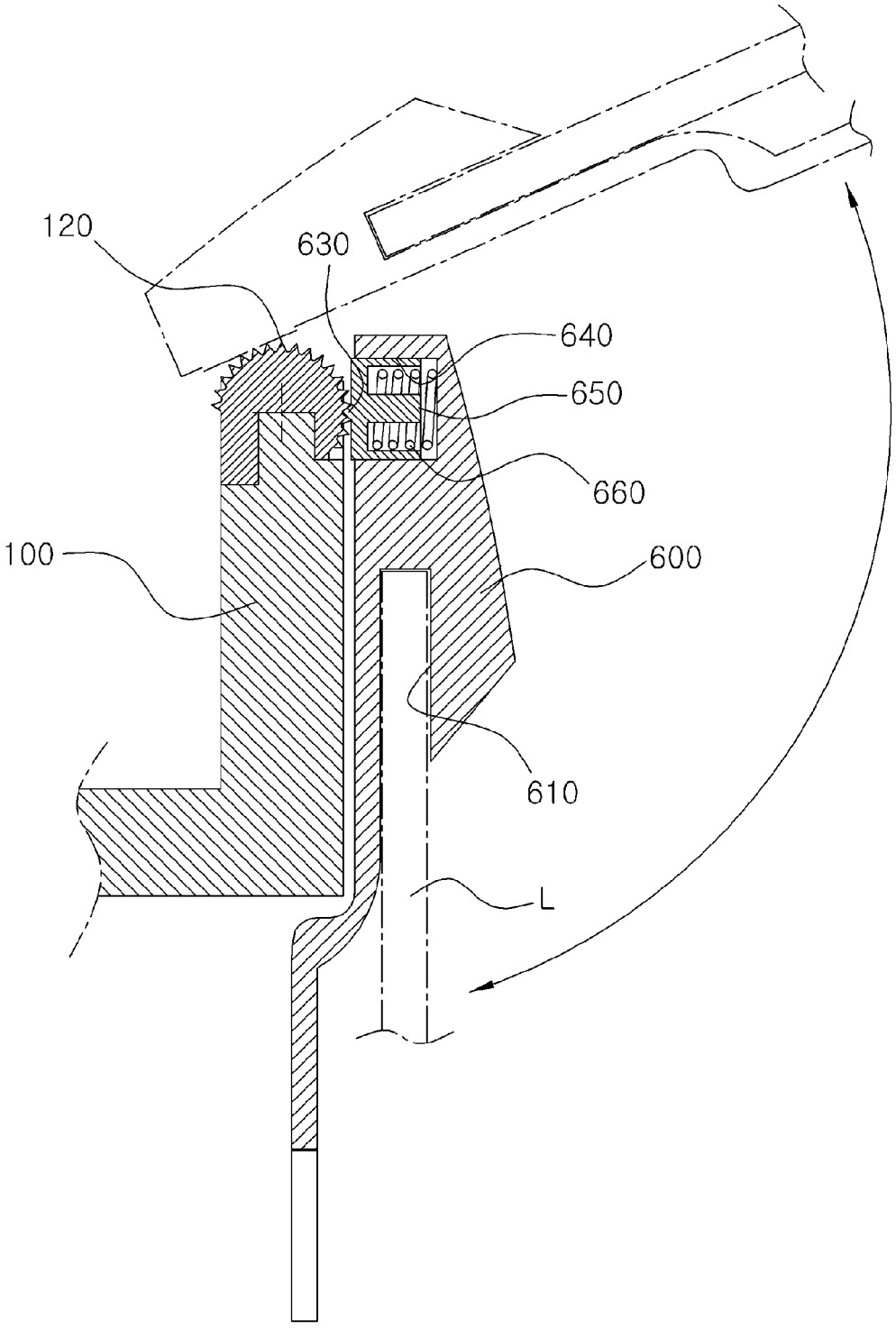


FIG. 8



DETACHABLE SAFETY GOGGLES FOR SAFETY HELMETS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to detachable safety goggles for safety helmets which may be used while being detachably attached to a safety helmet.

2. Description of the Related Art

For the sake of safety during operations at various industrial sites, workers wear safety helmets. In general, a safety helmet is not equipped with safety goggles for convenience of an operation. Therefore, when a worker wearing a safety helmet that is not equipped with safety goggles performs operations, the worker may not open his/her eyes or hurt his/her eyes due to intense light or flying foreign debris.

Therefore, a safety helmet equipped with safety goggles may be provided. In this case, the safety goggles are formed in a screen type shielding the entirety of the face of a worker, and both sides of the safety goggles are shaft-coupled with both sides of the safety helmet. Therefore, in case of such a safety helmet, attaching/detaching of the safety goggles to/from the safety helmet may be difficult, and use of safety goggles may be inconvenient due to the large size of the safety goggles.

In order to solve such inconvenience, a worker may separately wear sunglass-type safety goggles. In this case, the safety goggles may cause inconvenience due to sweat or the worker may repeatedly put on and take off the safety goggles.

SUMMARY OF THE INVENTION

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide detachable safety goggles for safety helmets which may be used while conveniently adjusting the distance and angle of the detachable safety goggles with the eyes of a worker according to conditions of the worker.

It is another object of the present invention to provide detachable safety goggles for safety helmets which may rotate lens upward and downward.

In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of detachable safety goggles for safety helmets including a frame provided with a lens mounted at the front part thereof and rack gears formed in the forward and backward directions at both leg parts thereof, inner housings, each of which is formed in a cylindrical shape, at least one end surface of which is opened, and is provided with first holes formed through the side surface thereof so that each of leg parts may enter and exit each of the inner housings through the first holes, and first snap protrusions formed on the inner surface contacting the at least one opened end surface, outer housings, each of which is formed in a cylindrical shape, one end surface of which is closed and the other end surface of which is opened, and is provided with second holes formed through the side surface thereof so that each of the leg parts combined with the first holes may enter and exit each of the outer housings through the second holes and be rotated by a designated angle upward and downward, and a first snap gear corresponding to the first snap protrusions of each of the inner housings and formed on the closed end surface, a rotation shaft hole being formed through the center of the first snap gear, rotating handles, each of which is combined with the rotation shaft hole of each of the outer housings and is provided with a pinion gear formed at the end thereof inserted into each of the outer housings so as to be engaged with each of the rack gears, and holders, each of which is combined with the upper end of each of the outer housings and is combined with the frame of a safety helmet.

A coupling unit to combine each of the outer housings and each of the holders may include a rotating protrusion formed in a flat disc shape by cutting both sides of a sphere, and a rotating hole provided with a spherical inner space corresponding to the rotating protrusion.

A second snap gear may be combined with the center of the front part of the frame, rotating shafts may be formed at both sides of the second snap gear, and a mounting member including slots formed at both sides of the front part of the mounting member so that the lens may be inserted into the slots, rings formed at both sides of the rear part of the mounting member and inserted into the rotating shafts so as to be rotated, and a second snap protrusion corresponding to the second snap gear and formed between the rings may be provided.

The mounting member may further include a groove formed between the rings, a coil spring inserted into the groove, and a pusher provided with a second snap protrusion formed on the rear end surface thereof pusher under the condition that the pusher is inserted into the groove.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective view illustrating detachable safety goggles for safety helmets in accordance with one embodiment of the present invention;

FIG. **2** is an exploded perspective view illustrating a first essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention;

FIG. **3** is a longitudinal-sectional view illustrating the first essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention;

FIGS. **4** and **5** are transversal-sectional views illustrating the first essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention;

FIG. **6** is a longitudinal-sectional view illustrating the first essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention;

FIG. **7** is an exploded perspective view illustrating a second essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention; and

FIG. **8** is a longitudinal-sectional view illustrating the second essential portion of the detachable safety goggles for safety helmets in accordance with the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Now, preferred embodiments in accordance with the present invention will be described in detail with reference to the annexed drawings.

Detachable safety goggles for safety helmets in accordance with one embodiment of the present invention, as exemplarily shown in FIGS. **1** to **8**, include a frame **100** provided with rack gears **110** formed at both leg parts thereof, inner housings **200**

provided with first snap protrusions **220** so that the leg parts enter and exit the inner housings **200**, outer housings **300** provided with first snap gears **320** corresponding to the first snap protrusions **220** and accommodating the inner housings **200** so that the leg parts enter and exit the outer housings **300**, rotating handles **400** combined with the outer housings **300** and provided with pinion gears **410** corresponding to the rack gears **110**, and holders **500** combined with the upper ends of the outer housings **300** and fixed to the frame of a safety helmet.

A lens L is mounted at the front part of the frame **100**, and the rack gears **110** are arranged in the forward and backward directions at both leg parts of the frame **100**. Although the embodiment shown in FIG. **1** illustrates the part of the frame **100** where the lens L is mounted and the leg parts of the frame **100** as being formed integrally, the part of the frame **100** where the lens L is mounted and the leg parts of the frame **100** may be separately formed and then connected by hinges.

The rack gear **110** is engaged with the pinion gear **410** of the rotating handle **400**, which will be described later, and serves to adjust the wearing distance between the eyes of a wearer and the safety goggles. From the viewpoint of characteristics, the rack gear **110** is formed on the outer surface of the leg part for the sake of wearer comfort and, in this case, the rack gear **110** may be formed on the upper or lower region of the outer surface of the leg part, or be formed on both the upper and lower regions of the outer surface of the leg part. Further, although FIGS. **1** and **2** illustrate the rack gear **110** as being formed at the upper end of a groove formed on the outer surface of the leg part, the rack gear **110** may be protruded from the outer surface of the leg part, as needed.

The leg part is inserted into the inner housing **200** so as to be combined with the inner housing **200**. The inner housing **200** is formed in a cylindrical shape, at least one end surface is opened, first holes **210** are formed through the side surface of the inner housing **200** so that the leg part may enter and exit the inner housing **200** through the first holes **210**, and the first snap protrusions **220** are formed on the inner side surface contacting the opened end surface of the inner housing **200**. Therefore, the inner housing **200** may move forward and backward under the condition that the leg part is combined with the inner housing **200** and thus the wearing distance between the eyes of the wearer and the safety goggles may be adjusted, and the inner housing **200** may rotated upward and downward under the condition that the inner housing **200** is inserted into the outer housing **300**, which will be described later, and thus the wearing angle of the safety goggles may be adjusted.

The inner housing **200** is inserted into the outer housing **300** so as to be combined with the outer housing **300**, and the outer housing **300** restricts the rotating angle of the inner housing **200**. The outer housing **300** is formed in a cylindrical shape, one end surface of which is closed and the other end surface of which is opened, second holes **310** are formed through the side surface of the outer housing **300** so that the leg part combined with the first holes **210** may enter and exit the outer housing **300** through the second holes **310** and be rotated by a designated angle upward and downward, and the first snap gear **320** corresponding to the first snap protrusions **220** of the inner housing **200** is formed on the closed end surface of the outer housing **300**. Further, a rotation shaft hole **330** is formed through the center of the snap gear **320** so that the rotating handle **400**, which will be described later, may be combined with the rotation shaft hole **330**. Therefore, if the wearing distance between the eyes of the wearer and the safety goggles is adjusted, the leg part enters and exits the outer housing **300** through the second holes **310** corresponding to the first holes **210**, and if the wearing angle of the safety goggles is adjusted, the leg part contacts the upper ends or the lower ends of the second holes **310** and is thus restricted to a designated angle.

The rotating handle **400** serves to adjust the wearing distance between the eyes of the wearer and the safety goggles and is combined with the rotation shaft hole **330** of the outer housing **300**, and the pinion gear **410** engaged with the rack gear **110** of the leg part is formed at the end of the rotating handle **400** inserted into the outer housing **300**. Therefore, when the rotating handle **400** is rotated, the leg part moves forward and backward through the rack gear **110** engaged with the pinion gear **410**, and thereby, the wearing distance between the eyes of the wearer and the safety goggles may be adjusted. In order to prevent the rotating handle **40** from being released from the outer housing **300**, the rotating handle **400** includes a hook fastened to the rotation shaft hole **330**, as exemplarily shown in FIGS. **2** and **3**.

The holder **500** serves to detachably attach the outer housing **300** to the frame of a safety helmet, and is combined with the upper end of the outer housing **300**. Therefore, in accordance with the embodiment, as exemplarily shown in FIGS. **1** and **2**, the holder **500** may have a bent clip form so that the holder **500** is not removed from the frame of the safety helmet after the holder **500** is fitted into the frame of the safety helmet.

The outer housing **300** and the holder **500** are combined with each other by a coupling unit. As exemplarily shown in FIGS. **1** and **2**, the coupling unit includes a rotating protrusion **510** formed in a flat disc shape by cutting both sides of a sphere, and a rotating hole **340** provided with a spherical inner space corresponding to the rotating protrusion **510**. Here, the rotating protrusion **510** may be formed on one of the outer housing **300** and the holder **500** and the rotating hole **340** may be formed on the other of the outer housing **300** and the holder **500**. For example, FIG. **2** illustrates the rotating hole **340** as being formed at the upper end of the outer housing **300**, and the rotating protrusion **510** as being formed at the lower end of the holder **500**.

Further, the coupling unit to combine the outer housing **300** and the holder **500** is configured such that the outer housing **300** may be rotated in the leftward and rightward directions (in the inward and outward directions of the safety helmet) so as to correspond to the size and shape of the safety helmet.

Here, rotation does not mean rotation about one shaft, but means rotation about one pivot point. Therefore, the coupling unit may adjust tilt and horizontality as well as rotating angle.

The detachable safety goggles for safety helmets in accordance with the embodiment of the present invention may be configured such that the lens L mounted on the frame **100** may be rotated upward and downward so as to be opened and closed. In accordance with the embodiment of the present invention, as exemplarily shown in FIGS. **1**, **7**, and **8**, a second snap gear **120** is combined with the center of the front part of the frame **100**, rotating shafts **130** are formed at both sides of the second snap gear **120**, and a mounting member **600** is provided. The mounting member **600** includes slots **610** formed at both sides of the front part of the mounting member **600** so that the lens L may be inserted into the slots **610**, rings **620** formed at both sides of the rear part of the mounting member **600** and inserted into the rotating shafts **130** so as to be rotated, and a second snap protrusion **630** corresponding to the second snap gear **120** and formed between the rings **620**. Therefore, the mounting member **600** may be rotated upward and downward by the rotating shafts **130** and the rings **620**, and maintain a rotating angle by the second snap gear **120** and the second snap protrusion **630**.

In this case, a groove **640** is formed between the left and right rings **620** of the mounting member **600**, and a coil spring **650** inserted into the groove **640** and a pusher **660** provided with a second snap protrusion **630** formed on the rear end surface thereof under the condition that the pusher **660** is inserted into the groove **640** are provided, thereby more stably rotating the lens L and maintaining the rotating angle of the lens L using elastic force of the coil spring **650** between the second snap protrusion **630** and the second snap gear **120**.

In accordance with another embodiment of the present invention, the legs of the detachable safety goggles for safety helmets are not protruded to the outside and are curved in the inward direction of the head of a wearer so as to be bent in the same shape as the head of the wearer, as shown in the drawings, thus preventing the safety goggles from encumbering the wearer during operation. That is, the detachable safety goggles for safety helmets may be configured as detailed bellow.

Both leg parts of the frame **100** provided with the rack gears **110** are curved in the inward direction of the head of the wearer, and first holes **210** formed on the inner housings **200** are formed in a curved shape corresponding to the leg parts so that the leg parts may enter and exit the first holes **210**.

Further, second holes **310** formed on the outer housings **300** are formed in a curved shape corresponding to the leg parts so that the leg parts combined with the first holes **210** may enter and exit the second holes **310** and be rotated by a designated angle upward and downward. That is, the inner housings **200** and the outer housings **300** are also curved so as to correspond to the shape of the leg parts, thus allowing the detachable safety goggles for safety helmets to be smoothly operated without friction between the frame **100** and the inner and outer housings **200** and **300**.

As described above, the detachable safety goggles for safety helmets in accordance with the present invention may be simply attached to and detached from a safety helmet and the wearing distance and angle of the detachable safety goggles for safety helmets with a worker may be conveniently adjusted as the worker desires. Further, the detachable safety goggles for safety helmets may rotate a lens upward and downward, thus being more conveniently used.

As apparent from the above description, the present invention provides detachable safety goggles for safety helmets which may be simply attached to and detached from a safety helmet and the wearing distance and angle of the detachable safety goggles for safety helmets with a worker may be conveniently adjusted as the worker desires, thus being more conveniently used.

Further, the detachable safety goggles for safety helmets in accordance with the present invention may rotate a lens upward and downward, thus being more conveniently used.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. Detachable safety goggles for safety helmets comprising:

a frame provided with a lens mounted at the front part thereof and rack gears formed in the forward and backward directions at both leg parts thereof;

inner housings, each of which is formed in a cylindrical shape, at least one end surface of which is opened, and is provided with first holes formed through the side surface thereof so that each of leg parts may enter and exit each of the inner housings through the first holes, and first snap protrusions formed on the inner surface contacting the at least one opened end surface;

outer housings, each of which is formed in a cylindrical shape, one end surface of which is closed and the other end surface of which is opened, and is provided with second holes formed through the side surface thereof so that each of the leg parts combined with the first holes may enter and exit each of the outer housings through the second holes and be rotated by a designated angle upward and downward, and a first snap gear corresponding to the first snap protrusions of each of the inner housings and formed on the closed end surface, a rotation shaft hole being formed through the center of the first snap gear;

rotating handles, each of which is combined with the rotation shaft hole of each of the outer housings and is provided with a pinion gear formed at the end thereof inserted into each of the outer housings so as to be engaged with each of the rack gears; and

holders, each of which is combined with the upper end of each of the outer housings and is combined with the frame of a safety helmet.

2. The detachable safety goggles for safety helmets according to claim **1**, wherein a coupling unit to combine each of the outer housings and each of the holders includes:

a rotating protrusion formed in a flat disc shape by cutting both sides of a sphere; and

a rotating hole provided with a spherical inner space corresponding to the rotating protrusion.

3. The detachable safety goggles for safety helmets according to claim **1**, wherein a coupling unit to combine each of the outer housings and each of the holders is configured such that each of the outer housing is rotatable in the leftward and rightward directions (in the inward and outward directions of the safety helmet) so as to correspond to the size and shape of the safety helmet.

4. The detachable safety goggles for safety helmets according to claim **1**, wherein:

a second snap gear is combined with the center of the front part of the frame;

rotating shafts are formed at both sides of the second snap gear; and

a mounting member including slots formed at both sides of the front part of the mounting member so that the lens may be inserted into the slots, rings formed at both sides of the rear part of the mounting member and inserted into the rotating shafts so as to be rotated, and a second snap protrusion corresponding to the second snap gear and formed between the rings is provided.

5. The detachable safety goggles for safety helmets according to claim **4**, wherein the mounting member further includes:

a groove formed between the rings;

a coil spring inserted into the groove; and

a pusher provided with a second snap protrusion formed on the rear end surface thereof pusher under the condition that the pusher is inserted into the groove.

6. The detachable safety goggles for safety helmets according to claim **1**, wherein:

both leg parts of the frame are curved in the inward direction of the head of a user;

the first holes formed on each of the inner housings are formed in a curved shape corresponding to the leg parts so that each of the leg parts may enter and exit the first holes; and

the second holes formed on each of the outer housings are formed in a curved shape corresponding to the leg parts so that each of the leg parts combined with the first holes may enter and exit the second holes and be rotated by a designated angle upward and downward.

* * * * *